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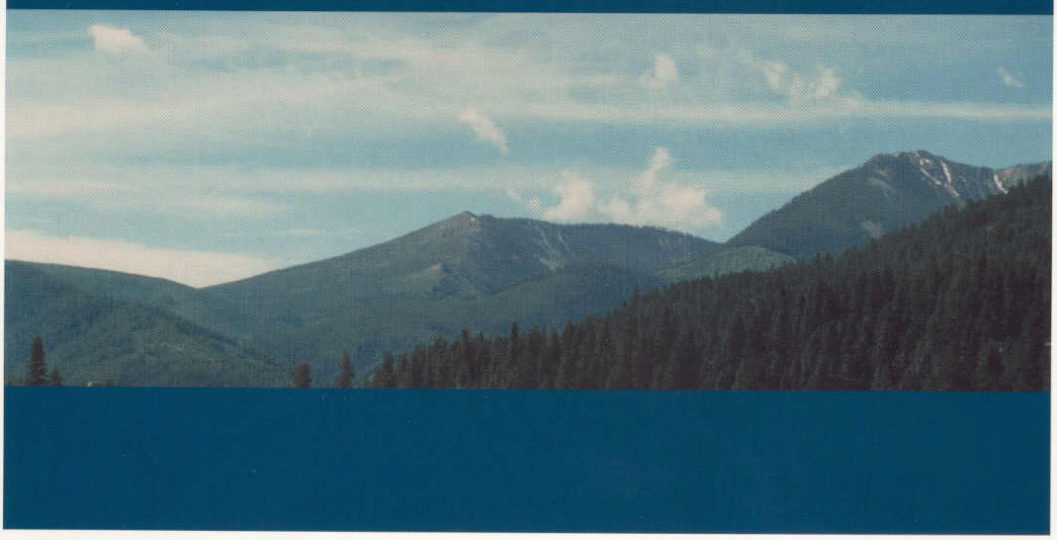
WPO Publication No. 14

The Mystery of Lost Trail Pass

A Quest for Lewis and Clark's Campsite of September 3, 1805



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The Mystery of Lost Trail Pass

Lewis and Clark Trail Heritage Foundation, Great Fall, Montana., 2000

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Applying the Tools of Reason and Technology

by Steve F. Russell

Pages 39-67

This documents my research methods for finding the Lewis and Clark Trail over the mountains.

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Applying the Tools of Reason and Technology

by Steve F. Russell

(Draft Edition, April 30, 1998, Rev: 9-17-98, Rev: 12-28-99)

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VERSIONS
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Lewis and Clark over Lost Trail Pass

Applying the Tools of Reason and Technology

by Steve F. Russell[1]

(Draft Edition, April 30, 1998, Rev: 9-17-98, Rev: 12-28-99)

Introduction

During September 1-4, 1805, the Corps of Discovery under the command of Lewis and Clark bushwacked their way northward over the dividing ridge between the waters of what they called Lewis' River on the south and Clark's River on the north. They began on the Salmon River in Idaho and their destination was the Bitterroot River in Montana. They were not following an established Indian trail because they chose to go due north over the most direct route possible. The established Indian trail, at that time, looped eastward through the Big Hole before going northward up Trail Creek, over Gibbons Pass, and then into the Bitterroot Valley.

The route of the Corps of Discovery over Lost Trail Pass is, to repeat an often used phrase, "a puzzle wrapped in a mystery, shrouded by an enigma." It remains a major challenge to the Lewis and Clark trail community to determine their route for September 1-4, 1805 and their September 2nd and 3rd camping sites. This paper reports on a technique the author has developed, using topography and computer analysis techniques, that can be applied to the Lost Trail route.

For the past 12 years, I have been doing research on the Lolo Trail from Lolo, Montana to Weippe, Idaho. This work is nearing completion and will result in the accurate location and documentation of the trails within the Lolo Trail System: the Northern Nez Perces Trail, the Bird-Truax Trail, and the Lewis and Clark route. The research techniques developed for the Lolo Trail were applied to the Lost Trail route using modern map data and the expedition's journal narratives and maps. While the Lolo Trail research results were validated by cross-checking with many other historical sources, as well as ground truthing, no known equivalent resources exist for the Lost Trail route. The party "bushwhacked" their way over the pass and did not follow an established "roade." Without the remnants of a well-travelled Indian trail, we are left with only their journal records and the topography to be our guide.

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Previous Route Analysis (1988-89)

In 1988, I prepared a map display for the Montana 1989 Centennial celebration which is now in the Bitter Root Historical Society museum in Hamilton, Montana. At that time, my estimate of the route up the North Fork of the Salmon was based entirely on reading the journals and studying the Clark maps and comparing both to modern topography. I hadn't yet developed the good computer analysis technique or done field research.

The original Clark map for the route over Lost Trail Pass is on two different pages in the Moulton edition of Lewis and Clark's journals [1]. To create a map useful for analysis, it was necessary to prepare a scrivener facsimilie of the map (Figure 1). Clark's notation and hachure were used. In 1989, a second map was created (Figure 2) portraying a topographically-corrected scrivener reproduction of the same geographic area which includes the estimated route and campsites. Notice that the general topography between Clark's map and a modern map is very similar but some details are distorted. It is in the area of the camp of September 3rd that this distortion becomes a signficant impediment to modern attempts to locate their campsites.

This preliminary research in 1988 indicated that the camp of September 1st was at the mouth of Hull Creek, the camp of September 2nd was somewhat south of the mouth of Twin Creek, and that the Camp of September 3rd was at the head of Colter Creek. Ground truthing was not done for this work and this was the best information I had available to me at the time. Recently, I had the opportunity to study maps of the route as proposed by Plassman which show that he also thought this was the correct route. Subsequent research I've done shows that this preliminary work was not correct in the Lost Trail Pass area.

Current Research Methodology and Results (1997)

The 1997 research technique begins with the study of the Moulton atlas [1], maps 67 and 68. The map context, topography and journal narrative make it clear that the party traveled up the North Fork Salmon River (which Clark's map calls "Fish Creek"), crossed the divide, and traveled down Camp Creek to the East Fork Bitterroot River. The major drainage labeled *Berry Creek* is not accurately portrayed and is probably Indian Creek in its lower part and either Overwhich Creek or Hughes Creek in its upper part. Both the latter creeks are on the Montana side. These errors in topographical depiction along with some inaccuracies and inconsistencies in journal descriptions, courses, and distances create a mystery to be solved.

Figure 3 shows Clark's map with only the water courses indicated. Some of the modern geographic references that were easily identified are shown. The next step

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is to do a preliminary topography study to see if there are a few geographic locations (to be used as anchor points) along the route that can be located with good accuracy. These were determined to be the mouth of Dahlonega Creek (Anchor Point #1), the dividing ridge between Idaho and Montana, (Anchor Point #2), and the September 4th encampment (Anchor Point #3).

This initial analysis showed the the Clark map to be distorted in two ways. First, the map in the Moulton edition has been oriented so that true north approximately aligns with the page. The courses given in the journal are in magnetic north and cannot be plotted directly on the Moulton map without correcting for magnetic declination and some orientation error due to printing. Second, the journal distances tend to be overestimated when the travel is difficult and more nearly correct when the travel is easy. In order to compare Moulton's edition of Clark's map with modern topography, it is necessary to rotate it and change the distance scale.

Choosing different geographic reference frames for the rotation and distance scaling produced different results. To illustrate this, the modified Clark map using Reference Frame #1 (Figure 4) has been rotated to align it to the modern topography and distance scaled so that Sula and the mouth of Dahlonega Creek (near Gibbonsville) closely align to their correct positions. The modified Clark map is shown lightly in the background, overlaid with modern water courses. Because the distance scale distortion varies over the area of the map, it is not possible to get good alignment for all geographic features. For example, notice that Clark's portrayal of the Lost Trail Pass area for Reference Frame #1 is too far north.

Reference Frame #2, (Figure 5) for the modified Clark map looks similiar to Figure 4 except the distance scale has been changed so that Dahlonega Creek is closely aligned to the correct position, the forks of Camp Creek are closely aligned, and the Lost Trail Pass area is as closely aligned as possible. Notice now that Clark's protrayal of the Sula area is much too far south.

It is clear from Figures 4 and 5 that global scaling and rotation cannot correct for all the errors in the Clark map. However, the scaled distance between reference points #1 and #2 is reasonably close to being the same for both maps. What is needed is a computer data analysis technique that will permit scaling and rotation over a small group of courses and distances. Such a method, using map templates and a spreadsheet program, is described in the next section. Initially, it appears that Figure 5 provides the best alignment of the modern topography to the map drawn by Clark and is selected as the starting point for the spreadsheet analysis.

Ordering of Geographic Clues - Reason and Technology

The way this approach is carried out is much like a mathematical proof. Each step

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is carefully analyzed and the evidence presented in a series of maps like the series of steps in the proof. The goal is to lead the reader through the details of the logic used to arrive at the conclusions and not merely to present the conclusions without detailed proof.

All of the data and comments in the journals were studied and summarized into a series of geographic clues such a mention of streams and mountains. These were then put into geographic order using journal distances and spreadsheet analysis. The ordering process was iterated until the arriving at the order which best fits all the data and known modern topography. The route was then divided into segments for this process. The first step in the analysis was to determine approximate corrections for magnetic declination and distance scaling for the courses and distances from the table starting on page 184 of Vol. 5 (Moulton).

Next, a "ground track" plot for these corrected courses and distances was superimposed on the modified Clark map as shown in Figure 6. This overlay shows that Clark's table data and map are in general agreement but that there are some disagreements that make determining their exact route and camping places difficult. The ground-track data from Clark's table was also plotted on a modern topographic map using Reference Frame #1 (Figure 7) and Reference Frame #2 (Figure 8). Several points in the two reference frames are in close enough agreement that the reference points given in Table I could be easily identified.

Table I. Easily Identified Reference Points

Journal Citation	Modern Geographic Name
Encamped on the bottom... at a *Bluff Point*	mouth of Hull Creek near Bill's Canyon
to *a large fork* which falls in on the left in a pine bottom	Hughes Creek
to *a large fork* which falls in on the right	Sheep Creek
to *the forks of the Creek*	mouth of Dahlonega Creek
a fork on the right ascending	Pierce Creek
a fork on the left, *passing one on the left*	West Fork of the North Fork of the Salmon near the mouth of Moose Creek
dividing ridge	The Montana-Idaho border west of Lost Trail Pass
to *the river... a fork on the right*	between camp creek and Edwards road about 0.3 miles southeast of the East Fork of the Bitterroot river

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After conducting several "what-if" scenarios with the spreadsheet, it was apparent that the route could be analyzed in the following four segments:

***Segment-1*, Bill's Canyon to Dahlonega Creek**
***Segment-2*, Dahlonega Creek to Moose Creek**
***Segment-3*, Over Lost Trail Pass**
***Segment-4*, Forks of Camp Creek to Sula**

Segment-1

The ground track overlay for Segment-1 is shown in Figure 9. The scaled and rotated journal data fits the topographic data extremely well. Journal topographic reference points were assigned to Bill's Canyon (Ref #1), Hughes Creek (Ref #2.), Sheep Creek (Ref #3), and Dahlonega Creek (Ref #4).

Segment-2

The ground track overlay for Segment-2 is shown in Figure 9. The following reference points were assigned: Vineyard Gulch (Ref #5), Crone Gulch (Ref #6), Quartz Creek (Ref #7), Deep Creek (Ref #8), Twin Creek (Ref #9), Pierce Creek (Ref #10), and Moose Creek (Ref #12). There is no definite geographic name to assign to Ref #11 however Clark made reference to *"several spring runs on the right, stony hills and falling timber"* in his table. The scaled and rotated journal data in Segment-2 fits the topographic data quite well except for the distance between reference points #10 and #12. To make the plot shown in the figure, it was necessary to add 2 miles to the journal distance between #10 and #12, making the new distance, 4.5 miles instead of 2.5 miles. This discrepancy is unexplainable.

Segment-3

The ground track overlay for Segment-3 is shown in Figure 9. The scaled and rotated journal data does not fit the topographic data very well, especially for the camp of September 3rd. More analysis will be needed to determine a better estimate than simple scaling and rotation.

We now will analyze Segment-3, "Over Lost Trail Pass", in more detail. This analysis started with a detailed, ordered listing of the geographic references given in the journals of Clark, Gass, Whitehouse, and Ordway. Some references from Segment-3 are used to describe the entire day's data. These references are listed in Table II.

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Table II. Ordered Geographic References for September 3, 1805					
Cum Miles	**Clark, Text**	**Clark, Table**	**Gass**	**Whitehouse**	**Ordway**
.	.	hilly and thick assending	.	.	.
2.5	.	miles to a small fork on the left	.	.	.
4.5	.	to a fork on the right assending	.	.	.
.	.	several spring runs on the right, stony hills and falling timber	.	Proceeded on up the creek a short distance and then took to the mountains	proceeded on up the branch a short distance further up the branch and then took the mountain and went up and down rough rockey mountains all day
7.0	.	to a fork on the left passing one on the left	.	.	.
.	high mountains closed the creek on each side. take on the steeps sides of those mountains	passing over steep points and winding ridges, passed a run on the right	.	crossed an abundance of fine springs and spring runs	crossed a number of fine spring branches
9.0	Crossing several steep points and one mountain	to a high point	having gone nine miles, halted for dinner	.	.
.		passed 2 runs from the left, passing on the side of a steep ridge. no road.		.	we dined at a branch
11.0		to the top of a high hill		.	.
.		leaving the waters of the creek to the right		.	.
.		passing over a high pine mountain	went on about 3 miles over a large mountain to the head of another creek	towards evening, crossed a dividing ridge, we went some distance on the top of it, which was tolerable smooth and good traveling	towards evening we assended a mountain went some distance on top of it.

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.	.	.	.	passed down a steep hill	went down into a cove near the head of a branch running nearly an opposite course from the branch we dined on at noon.
14.0	Encamped on a branch of the creek we assended	to the head of a drain running to the left	to the head of another creek and encamped	head of a cove and branch	we camped on this cove

The references of Table II for September 3rd are summarized in the following list in the geographic order of their travel:

(Ref #9) a small fork on the left
(Ref #10) a fork on the right assending
(Ref #11) several spring runs on the right
(Ref #12) a fork on the left passing one on the left
(Ref #13) steep points and winding ridges
(Ref #14) passed a run on the right
(Ref #15) a high point
(Ref #16) passing on the side of a steep mountain
(Ref #17) passed two runs from the left
(Ref #18) top of a high hill
(Ref #19) leaving the waters of the creek to the right
(Ref #20) a dividing ridge
(Ref #21) passing over a high pine mountain
(Ref #22) passed down a steep hill
(Ref #23) Evening Camp:
- a branch of the creek we assended (Clark, text)
- head of a drain running to the left (Clark, table)
- the head of another creek (Gass)
- head of a cove and branch (Whitehouse)
- head of a branch running nearly an opposite course from the branch we dined on at noon (Ordway)

Any proposed route for September 3rd must agree with the majority of these references and in the order given in the journals. Before looking at route alternatives, additional geographic detail such as watershed boundaries and elevations of various high points were added to Figure 9 to produce a map of the area around Lost Trail Pass. In addition, a study of the topography of the area and the field work in 1997 produced several candidate locations for the September 3rd camp. These are shown in Figure 10 with the candidate campsites having a reference point designation and a letter, (23A, 23B, ...). Although these are all possible locations, further analysis is needed to determine which locations are the

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most probable. We should also take into account that the weather was bad, with rain and sleet, and it is very likely that the party could not see out over the mountains very far to get good bearings. It may be that in the latter part of the day, their visibility was very poor when they had to seek a campsite.

Figure 10 also shows the map overlaid with the Clark's journal table data. The *high point* could be the prominent point (N 45d 40.32m; W 113d 56.97m) that Highway 93 winds around just after passing the mouth of Little Moose Creek. The *high hill* could be on the divide where the top of the ski tow is now located (N45d 41.41m; W113d 57.58m). The location of the camp given by the journal courses and distances is closest to point *23C* shown in Figure 10 which is at the head of Shields Creek.

Another way of looking at the data is illustrated by Figure 11 which shows the modified Clark map overlaid by the water courses and then overlaid by the ground track of the courses and distances. This map shows clearly their route up Moose Creek and then northward to the divide near the "Ski Tow" west of Lost Trail Pass. The camp location on the modified Clark map is considerably too far east on this scale but it looks like Clark intended to show the camp at the head of Colter Cr., a branch of Overwhich Cr. on the Montana side. If we were to interpret the course and distance literally, the camp would be at the head of Camp Cr. which we know is impractical. It appears a better approach is to closely analyze the geographic references and the courses and distances as compared to a modern topographic map.

We now need further study of the question, "does this route up to the high hill fit the ordered geographic references?" and then see if the ground track of Figure 10 fits the descriptions. Consulting the USGS 7.5 minute topographic map for the area (Lost Trail Pass, MT-ID) (as will be partially shown later in Figure 12), and starting northward at the mouth of Moose Creek, we can observe the following:

1. There are *steep points and winding ridges (Ref #13)* that the party is crossing
2. The *run on the right (Ref #14)* is Little Moose Creek
3. The *high point (Ref #15)* was discussed above
4. They were *passing on the side of a steep mountain (Ref #16)* after they passed the mouth of Little Moose Creek
5. They *passed two runs from the left (Ref #17)*, the first just across from Little Moose Cr. and the second about 0.5 miles above the mouth of Little Moose Cr.
6. The *top of a high hill (Ref #18)* is the top of the ski tow (elevation 7740) west of Lost Trail Pass.
7. They had left *the waters of the creek to the right (Ref #19)* which agrees with the topography for them to go up the major ridge to the northwest about 0.6 miles above the mouth of Little Moose Cr.
8. They came to *a dividing ridge (Ref #20)* when they reached the area of the ski tow.

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9. The *high pine mountain (Ref #21)*. they reported crossing is the dividing ridge and the large ridge (elevation 7975) to the west and south of the Ski Tow.

At this point we have agreement for the topo map comparison with the journal route description and the courses and distances. It seems a good strategy to consider the Ski Tow as the *top of a high hill (Ref #18)* in conjunction with their evening camp and where they *passed down a steep hill (Ref #22)* getting to the camp *(Ref #23)*. Using the Ski Tow area as an anchor point, we can prepare a table of courses and distances to the candidate camping places and compare them to the journal entry. This analysis is summarized in Table III. The table reveals that there is little course or distance correlation between any of the data for the candidate camping places and the journal data and the ground is much too steep for them to have camped on the West Fork of Camp Cr. on the Montana side. This brings us to looking at the route on the map and the suitability of the various camping places.

Table III. Summary of Courses and Distances from Ski Tow to Sept. 3rd Candidate Camp Sites - Compared to the Journal

Ref. Point	Location	Course Mag North	Distance Miles	Distance Ratio
Journal	--	*N40W*	*3.0*	--
23A	North Fork	N77W	1.7	0.57
23B	North Fork	N86W	1.25	0.42
23C	Shields Cr.	N60W	2.2	0.73
23D	Colter Cr.	N75W	1.9	0.63
23E	Colter Cr.	N86W	2.4	0.80

The shape of the route shown on the Clark map favors sites *23A*, *23B*, and *23D*. The overlay of the route information favors site *23D* but Site *23D* is, by field examination, the poorest place to camp of all the sites and is barely acceptable as a campsite. Site *23C* has acceptable camping but the route requires a retracing back over the dividing ridge and this is not mentioned in any of the journals or shown on the Clark map. Site *23E* is a large beautiful flat meadow area with horse feed and water and is an excellent campsite but its location seems too far away from the route plot shown on the Clark map and it also requires retracing.

This leaves us with Sites *23A* and *23B* as the best fit when everything is considered. We do not know what the vegetation was in 1805, but in 1997, Site *23B* was a beautiful meadow with a good water supply and a sufficiently flat area to make a good camp, but it lacks horse feed. Table IV is a summary of the campsite locations and their approximate latitude and longitude.

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The final topographic map of the controversial route over Lost Trail Pass, with camping locations, is given in Figure 12. An alternate route higher on the sidehill along Moose Cr. (dotted line), is also shown since the journal account is not specific enough to be definitive about the exact location in this area. The approximate route that would take the party through Sites *23A* and *23B* and best fits all the analysis in this paper was chosen and is shown with a solid line. Other routes are shown as dashed lines. For further verification, an equivalent map using the overlays of the water courses, the Clark map, and the selected route is given in Figure 13.

Table IV. Summary of Campsite Locations - Approximate Latitude and Longitude

Campsite	Label	Latitude	Longitude
September 2, 1805		N45d 35m 30.7s	W113d 58m 08.0s
September 3, 1805	23A	N45d 42m 13.8s	W113d 59m 30.6s
	23B	N45d 41m 52.5s	W113d 59m 01.2s
	23C	N 45d 42m 48.9s	W113d 59m 31.2s
	23D	N45d 42m 18.4s	W113d 59m 35.9s
	23E	N45d 42m 02.5s	W114d 00m 23.2s
September 4, 1805		N45d 50m 09.8s	W113d 58m 09.2s

N45° 50.163'
W113° 58.154'

Segment-4

The ground track overlay for Segment-4 is also shown in Figure 9. The following reference points were assigned: bad road (Ref #24), high snow mountain (Ref #25), a dividing ridge (Ref #26), rough rocky way (Ref #27), forks of Camp Creek (Ref #28), a direct course (Ref #29), Camp Creek Valley (Ref #30), Waugh Creek (Ref #31), Eoote-lash-Schute Camp (Ref #32). The scaled and rotated journal data again fit the topographic data quite good. The courses and distance accurately reflect their travel down Camp Creek. Some of these references have no modern geographic name.

Summary of the Proposed Route and Modern Maps

Final Table of ordered Geographic Reference Points

Table V shows a summary of the topographic reference points and their modern geographic names. Ground truthing data from 1997 is incorporated where available.

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Final Route Description with Maps

Figure 14 is an overlay of a topographic map showing the final results and the reference points for the route from Bills Canyon in Idaho to Sula in Montana. Figure 15 is a summary map of the route and camping places.

Table V. Summary of Final Results - Topographic Reference Points with Maps

Ref. No.	Journal Citation	Modern Geographic Name
1.	Encamped on the bottom... at a *Bluff Point*	mouth of Hull Creek near Bill's Canyon
2.	to *a large fork* which falls in on the left in a pine bottom	Hughes Creek
3.	to *a large fork* which falls in on the right	Sheep Creek
4.	to *the forks of the Creek*	mouth of Dahlonega Creek
5.	up *the west fork*	mouth of Vineyard Gulch
6.	up *the west fork*	0.2 miles northward from Crone Gulch
7.	*crossed a run*	Quartz Creek
8.	**Encampment of Sept. 2, 1805** on *the left side of the creek in a small stony bottom*	southward about 0.5 miles from the mouth of Deep Creek (approximate)
9.	to *a small fork* on the left	Twin Creek
10.	*a fork* on the right ascending	Pierce Creek
11.	*several spring runs on the right* [Clark, Jour].	on the east side of the canyon of the North Fork between Pierce Creek and Moose Creek
12.	*a fork* on the left, *passing one on the left*	West Fork of the North Fork of the Salmon near the mouth of Moose Creek
13.	passing over *steep points* & *winding ridges* [Clark, table]	these are the ridges to the northwest of Moose Creek and the highway
14.	passed *a run on the right* [Clark, table]	Little Moose Creek
15.	*a high point* (halted for dinner - Gass)	the prominent point (N 45d 40.32m; W 113d 56.97m) that Highway 93 winds around just after passing the mouth of Little Moose Creek.
16.	passing on the *side of a steep mountain*... No road [Clark, table]	they continued on the sides of the ridges to the northwest of Moose Creek

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17.	passed *2 runs from the left* [Clark, table]	these are the two creeks on the northwest side of Moose Creek shown on the topo map, the first at the mouth of Little Moose Creek and the second about 0.5 miles above the mouth of Little Moose Cr.
18.	*top of a high hill*	top of the Ski Tow west of Lost Trail Pass
19.	*leaving the waters of the Creek to the right* [Clark, table]	this agrees with the topography for them to go up the major ridge to the northwest about 0.6 miles above the mouth of Little Moose Cr. They would be leaving the waters of Moose Cr. to their right hand
20.	*a dividing ridge*	this is the dividing ridge on the Montana-Idaho border near the Ski Tow
21.	passing over *a high pine mountain* [Clark, table]	this is the dividing ridge and the large ridge (elevation 7975) to the west and south of the Ski Tow
22.	*passed down a steep hill*	this depends on the camp location but the description best fits the descent southwest down the steep side of the ridge into the 23B campsite
23.	**Encampment of Sept. 3, 1805** to the *head of a drain running to the left*	One of the campsites listed in this report, most likely at the head of the North Fork at sites 23A or 23B
24.	*bad road*	trail over the mountain and down to Camp Creek
25.	*high snow mountain*	this is the peak of elevation 8180 feet, in the lower half of Section 32, on the divide as they start down on the Montana side
26.	*dividing ridge*	The Montana-Idaho border west of Lost Trail Pass and descent into Camp Creek
27.	*very steep descent* [Clark, Jour]; *rough rocky way* [Whitehouse]	descent down into Camp Creek
28.	fell on the *head of a creek* [Clark, Jour]; hit on *the creek* and a *small valley* [Gass]	forks of Camp Creek and the valley of Camp Creek

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29.	on a direct course over a *high snow mountain*	over the divide between Montana and Idaho; endpoint approximately the forks of Camp Creek
30.	*a small valley*	Valley of Camp Creek
31.	*a run on the left*	Waugh Creek
32.	to *the river... a fork on the right*	between Camp Creek and Edwards Road about 0.3 miles southeast of the East Fork of the Bitterroot River. This was the Eoote-lash-Schute Camp

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APPENDIX ___ *From the Journals*

September 1, 1805 (Sunday) "Bluff Point"

Commentary:

This day they continued across the foothills of the mountains to the east of the Salmon River. Their route was northward along the sidehill *"up and down the high mountains"* and *"crossed several creeks"* of water. They descended a mountain *"nearly as steep as the roof of a house"* down to the valley of the North Fork of the Salmon, "*a large Creek*", and went up the valley and camped at some old *"Indian lodges of the Snake Indians."* Clark's table on page 184 (Moulton) says that they went *"2 miles up the creek to a bluff Point"*. This camp is located near the mouths of Hull Creek and Bills Canyon.

September 2, 1805 (Monday) "Dismal Swamp"

Locality:

Along the North Fork of the Salmon River between Hull Creek, north of North Fork, Idaho, and past Gibbonsville to their camp between Quartz Creek and Deep Creek, a little over a mile south of Twin Creek.

From the Journals:

The Day: The morning was wet and cloudy, it had rained some last night. It also rained a good deal this afternoon and some at their evening camp. They started out at 7 am. Sunrise was at 6:33 am and sunset was 7:47 pm.

Activities: They spent the day struggling northward up the North Fork of Salmon River and hunting produced only a few pheasants because of the scarcity of other game in these mountains.

The Route: They proceeded up the creek where some of the route was closely timbered with spruce and pine. The way was narrow and stony and injured the horse's hooves. They crossed several large spring runs and waded the North Fork a number of times. The North Fork had a number of large beaver dams and ponds as well as bad thickets of lodgepole pine, which caused the party to call the last six miles of this route "Dismal Swamp." Whitehouse also called it a "verry lonesome place." Towards the end of the day, the hills closed in on the creek and the party had to proceed along the sides of the hills. The going was very bad, very steep and rocky, and the horses would sometimes fall backwards and get hurt.

The Encampment: After traveling 13 miles (according to Gass and Whitehouse), the party camped near the North Fork in a thicket of lodgepole pine and balsam fir on the left (west) side of the creek in a small stony bottom.

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Commentary:

Their camp last night was along the North Fork at the mouth of Hull Creek near Bills Canyon. There is a distinctive rock bluff on the east side of the creek here that Clark called a "Bluff Point." This day, they continued northward up the North fork, first passing the canyon of Hughes Creek on their left and then Sheep Creek on their right. They left the Indian road at Dahlonega Creek and took the left hand fork. The route was very difficult going with swamps, thickets, and steep side hills. The toll taken on the horses was considerable. Clark took a course and distance reading at the mouth of Vineyard Gulch and then again just north of Crone Gulch where the canyon arced westward. Clark mentions they crossed a creek (Quartz Creek) and then went about a mile before stopping for the day. They camped on the west side of the creek between Quartz Creek and Deep Creek were there is a flat spot on the west side which can still be seen from the road.

Table A1. Courses, Distances, and Geographic Entries from the Journals September 2, 1805

Ref. Pt.	Compass	Miles	Comments by the Journal Writers
1.	-	-	Encamped on the bottom... at a *Bluff Point*
● proceeded on up the creek [Clark, Jour]. ● crossed several spring runs... waded the creek a number of times .. we call this place *"Dismal Swamp"* [Whitehouse]			
2.	North	1.5	to *a large fork* which falls in on the left in a pine bottom
3.	N45W	2.5	to *a large fork* which falls in on the right
● crossed a large fork from the right and one from the left [Clark, Jour]. ● passed a level pine bottom & pine hills. many beaver dams across the creek [Clark, table]			
4.	North	3.5	to *the forks of the Creek*
● at 8 miles, left the road [Clark, Jour]. ● leaving the road on our right which passes to the Missouri [Clark, table]. ● proceeded up *the west fork* without a road [Clark, Jour].			
5.	N60W	2.5	up *the west fork*
● proceeded on through *thickets* and over *rocky hill sides* [Clark, Jour]. ● crossed it [the creek] several times & passing through *thickets of brush* & over rocks [Clark, table]. ● it was about six miles through the thicket we call *"Dismal Swamp"* [Ordway].			
6.	N35W	3.0	up *the west fork*

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• over hills, rocks, & steep points & hill sides *on the left of the creek* [Clark, table]. • *up and down steep hills* [Clark, Jour]. • in some places we were obliged to go up *the side of the hills*, which are very steep, and then down again in order to get along at all [Gass]. • crossing a run at one mile [Clark, table].			
7.	N50W	1.0	*crossed a run*
8.	N50W	1.0	**Encampment of Sept. 2, 1805** on *the left side of the creak in a small stony bottom*
• we came 13 miles today and camped in a thicket of pine and balsam fir timber near the creek... this horrid bad going where we came up this creek, which we call "*Dismal Swamp*," was six miles and we are not out of it yet [Whitehouse]. • we went 13 miles and encamped [Gass]. • we went 13 miles this day and camped in a thicket near the creek [Ordway]. • made 5 miles and encamped [Clark, Jour]. • no game of any kind to be seen in these mountains [Ordway].			

September 3, 1805 (Tuesday) "Head of a Cove"

Locality:

Along the North Fork to the mouth of Moose creek and then along the sidehill northwest of Moose Creek and up to the divide between the North Fork and Camp Creek. They passed, but did not go through, Lost Trail Pass.

From the Journals:

The Day: A cloudy, cool morning with rain starting about 3 pm and then followed by sleet at the end of the day. They set out at 8 am. Sunrise was at 6:34 am and sunset was 7:45 pm

Activities: They breakfasted on the last of their salmon. The party spent the day going northward to the divide. At 9 miles, they halted for a dinner of flour and pork. The hunters had little success, killing only 3 pheasants. They had an accident which broke their last thermometer. They lay down to sleep being wet, hungry, and cold.

The Route: "The Country is timbered with Pine Generally the bottoms have a variety of Srubs & the fur trees in Great abundance" (Clark). The hills were high and rocky on each side of the creek. They passed a small fork on the left at 2½ miles and a "fork on the right assending" (Clark) at 4½ miles. It was 2½ miles further "to a fork on the left, passing one on the left and several spring runs on the right, stoney hills and fallen timber" (Clark). In the after part of the day, the high mountains closed in on the creek and the party had to take to the steep side of the mountains, so steep that the horses again had much difficulty. "Took to the mountains and when up and down them the whole of this day" (Whitehouse). Clark remarks they were "passing over Steep points & winding ridges to a high point, passed a run on the right." They went on to the "top of a high hill, passed 2 runs from the left, passing on the side of a steep ridge" (Clark).

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Ordway says “we dined at a branch.” After dinner, Gass reports “We then went on about 3 miles *over a large mountain*, to the *head of another creek* and encamped there for the night.” “Towards evening, we crossed a dividing ridge, we went some distance on top of it which was tolerable smooth & good traveling, We then passed down a steep hill, at the head of a cove and branch” (Whitehouse). From the top of a high hill, Clark says they went 3 miles “leaving the waters of the creek to the right & passing over a high pine Mountn. to the head of a Drean running to the left.”

The Route: The country was timbered with pine, fur, and shrubs. The hills were high and rocky on each side of the creek. Passed a small fork on the left. Passed a fork on the right ascending. To a fork on the left, passing one on the left and several spring runs on the right, stoney hills and fallen timber. In the after part of the day, the high mountains closed in on the creek and the party had to take to the steep side of the mountains, so steep that the horses again had much difficulty. Took to the mountains and when up and down them the whole day. Passed over steep points and winding ridges to a high point, passed a run on the right. Proceeded on to the top of a high hill, passed 2 runs from the left, passing on the side of a steep ridge. Passed over emense hills, crossed several steep points and one mountain. Dined at a branch. Towards evening, we crossed a dividing ridge, we went some distance on top of it which was tolerable smooth and odd traveling. We then passed down a steep hill, at the head of a cove and branch. After dinner, went on about 3 miles over a large mountain to the head of another creek. Left the waters of the creek to the right and passed over a high pine mountain to the head of a drain running to the left.

The Encampment: "Encamped on a branch of the creek we assended" (Clark, text). Encamped at "the head of a drean running to the left" (Clark, table). "Went on... to the head of another creek and encamped..." (Gass). "at the head of a cove and branch" (Whitehouse). Went down into a cove near the head of a branch running in nearly the opposite course from the branch we dined on at noon (Ordway).

Commentary:

They continued to travel along the North Fork past the canyon of Deep Creek and crossed Twin Creek and Vine Creek. They passed to the west of the mouth of Pierce Creek and then crossed the North Fork and followed up its east side to the mouth of Moose Creek. The route after this is confusing due to the general comments by the journal writers and the many topographic possibilities. Only after considerable study of the journals and Clark's Map is it possible to make a good estimate of the route. From the mouth of Moose Cr., they continued northeast up Moose Cr. but it is unclear as to which side or how far up on the sidehill out of the creek bottom. Once they passed the mouth of Little Moose Cr., they turned northward and reached the divide at the small knob where the Ski Tow is shown on the topo map. They then proceeded westward along the divide until they dropped down into the head of the North Fork where they camped.

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Table A2. Courses, Distances, and Geographic Entries from the Journals
September 3, 1805

Ref. Pt.	Compass	Miles	Comments by the Journal Writers
● hilly and thick ascending [Clark, Jour]. ● we proceeded on up the branch a short distance, then took the mountains and went up and down the mountains all day. Passed and crossed an abundance of fine springs and spring runs [Whitehouse].			
9.	N25W	2.5	to *a small fork* on the left
10.	N15W	2.0	to *a fork* on the right ascending
11.	-	-	*several spring runs on the right* [Clark, Jour].
● stony hills & fallen timber [Clark, Jour].			
12.	N22W	2.5	to *a fork* on the left, *passing one on the left*
● in the after part of the day, the high mountains closed the creek on each side [Clark, Jour]			
13.	N35W	3.0	passing over *steep points & winding ridges* [Clark, table]
14.	-	-	passed *a run on the right* [Clark, table]
15.	N18E	2.0	*a high point* (halted for dinner - Gass)
● obliged us to take on the steep sides of those mountains [Clark, Jour]			
16.	-	-	passing on the *side of a steep ridge*... No road [Clark, table]
17.	-	-	passed *2 runs from the left* [Clark, table]
● we pursued our journey up the creek, which still continued fatiguing almost beyond description ... having gone nine miles we halted for dinner [Gass] ● we dined *at a branch* [Ordway]			
18.	N32W	2.0	*top of a high hill*
19.	-	-	*leaving the waters of the Creek to the right* [Clark, table]
● towards evening we crossed *a dividing ridge* went some distance on the top of it which was tolerable good and smooth going. [Whitehouse]			
20.	-	-	*a dividing ridge*
● we then went on about 3 miles *over a large mountain*, to the *head of another creek* and encamped there for the night [Gass]			
21.	-	-	passing over *a high pine mountain* [Clark, table]
● the mountains to the east covered with snow [Clark, Jour] ● encamped on a *branch of the creek we ascended* after crossing *several steep points* and *one mountain* [Clark, Jour] ● *passed down a steep hill* into the *head of a cove and branch* where we camped after a disagreeable days march of only 11 miles [Whitehouse] ● towards evening we ascended *a mountain* went some distance on the top of it then went down in a cove near the head of a branch running nearly an opposite course from the branch we dined on at noon [Ordway] ● courses nearly north from the river [Clark, Jour]			
22.	-	-	*passed down a steep hill*

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23.	N40W	3.0	**Encampment of Sept. 3, 1805** to the *head of a drain running to the left*

September 4, 1805 (Wednesday) "Eoote-lash-Schute Nation"

Locality:

The divide at Lost Trail Pass northward along Camp Creek to Sula, Montana.

From the Journals:

The Day: The morning was clear and very cold. The mockersons were frozen hard. They started out about 8 am. Sunrise was at 6:35 am and sunset was 7:43 pm

Activities: They proceeded northward into the Bitterroot Valley. One of the men spotted two mountain sheep. They started out without anything to eat. The hunters killed a dozen pheasants and a deer.

The Route: Assended a *"high snow mountain"* and *"took a dividing ridge"* then descended a mountain down a rough rocky way through a large thicket of "bolsom fur", and then descended down to a large valley and a branch. Continued down the run (branch) to a run on the left and then down the run to a river which comes from the east. Towards evening arrived at a large encampment of the "flat head" (Eoote-lash-Schute) nation.

The Encampment: After traveling 12 miles to the forks, they met a part of the flat head nation of 33 lodges and about 80 men, 400 total and at least 500 horses, those people received us friendly .. we encamped with them & found them friendly but nothing but berries to eat a part of whcih they gave us... I was the first white man who ever wer on the waters of this river [Clark].

Commentary:

They climbed northward out of the head of the North Fork and reached the divide at an un-named peak of elevation 8120 feet and then followed the divide eastward to the unnamed peak of elevation 8180 feet. Here they headed down the ridge northward to the forks of Camp Creek and then down Camp Creek to near Sula. They camped before reaching the East Fork of the Bitterroot River and on the east side of Camp Creek. Their camp was with the Eoote-lash-Schute nation where there is a ranch house now. The camp was slightly south and west of the ranch house. In the early ranching days, there were still many teepee rings and some pine trees here but they were cleared for use as pasture.

Table A3. Courses, Distances, and Geographic Entries from the Journals September 4, 1805

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Ref. Pt.	Compass	Miles	Comments by the Journal Writers
24.			*bad road*
● ascended a *high snow mountain* and took *a dividing ridge* which we kept for several miles (our route on a dividing ridge 9 *ms* about) [Clark, Jour] ● ascended *a mountain* [Whitehouse] ● ascended the mountain onto the *dividing ridge* and followed it some time [Ordway] ● crossed *a large mountain* and hit on the creek and *a small valley* [Gass]			
25.	-	-	*high snow mountain*
26.	-	-	*dividing ridge*
● descended the mountain down *a rough way* [Ordway] ● descended the mountain by *very steep descent* [Clark, Jour] ● we descended the mountain down a *rough rocky way* and along through a large thicket of balsam fir timber ... then descended down into *a large valley on a branch* and halted to dine [Whitehouse]			
27.			*a very steep rough rocky descent*
28.	-	-	fell on the *head of a creek* [Clark, Jour]
29.	N10W	6.0	on a direct course over a *high snow mountain*
● down the run [Clark, table]			
30.	N18W	3.0	*a run on the left*
● down a drain of the Flathead River to a fork on the right [Clark, table] ● down the run *to a river* which comes in from the east, *a wide valley* [Clark, table] ● pursued our course *down the creek* to the forks about 5 miles [Clark, Jour]			
31.	N35W	3.0	**Encampment of Sept. 4, 1805** to *the river... a fork on the right*

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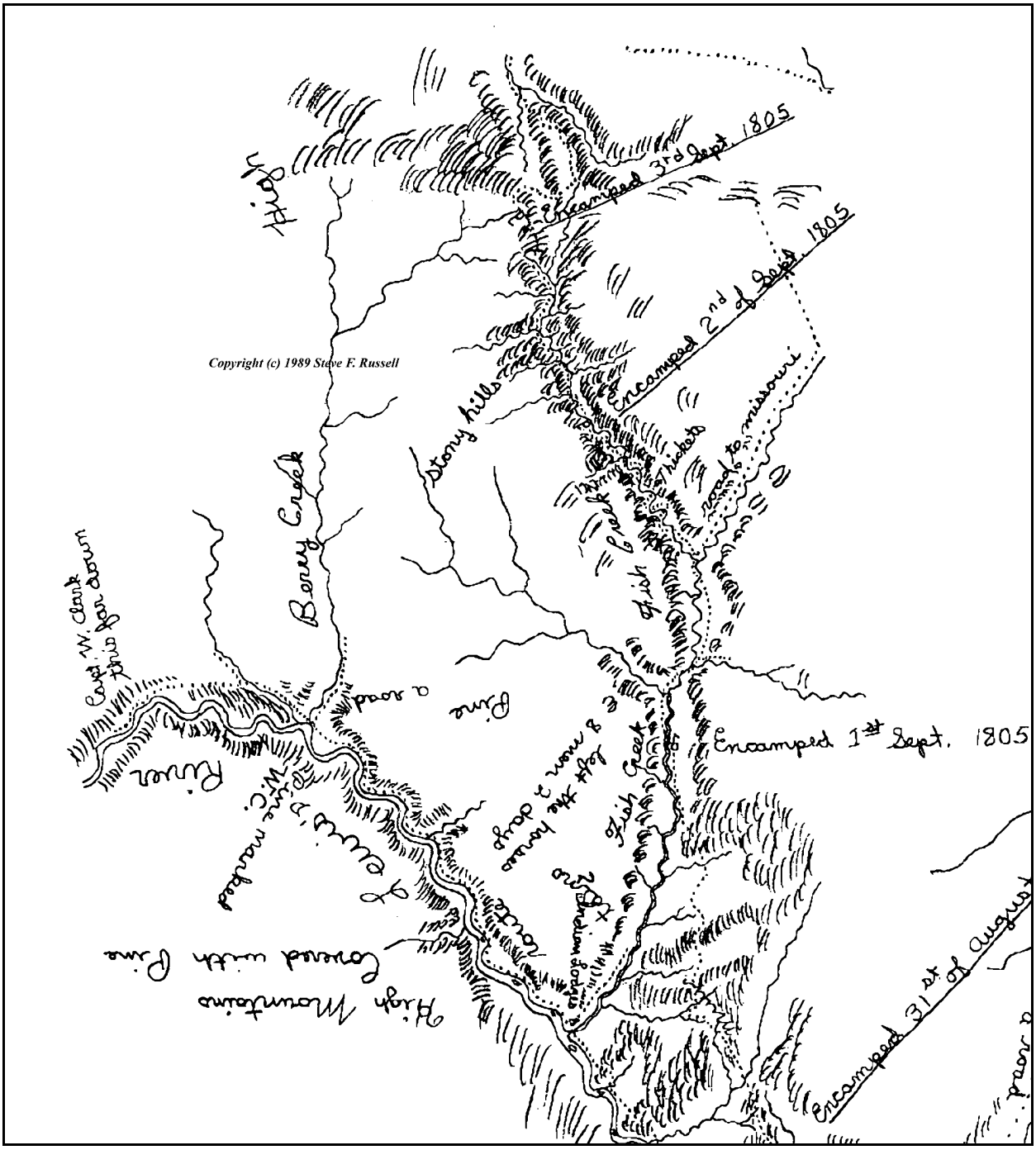


Figure 1. The 1989 scrivener facsimile of the Clark map prepared from the maps in Vol. 8 of the Thwaites edition of the journals. The bottom of the map is just south of North Fork, Idaho and the top of the map is just north of Lost Trail Pass. Gibbonsville is near the mouth of the creek marked "road to missouri."

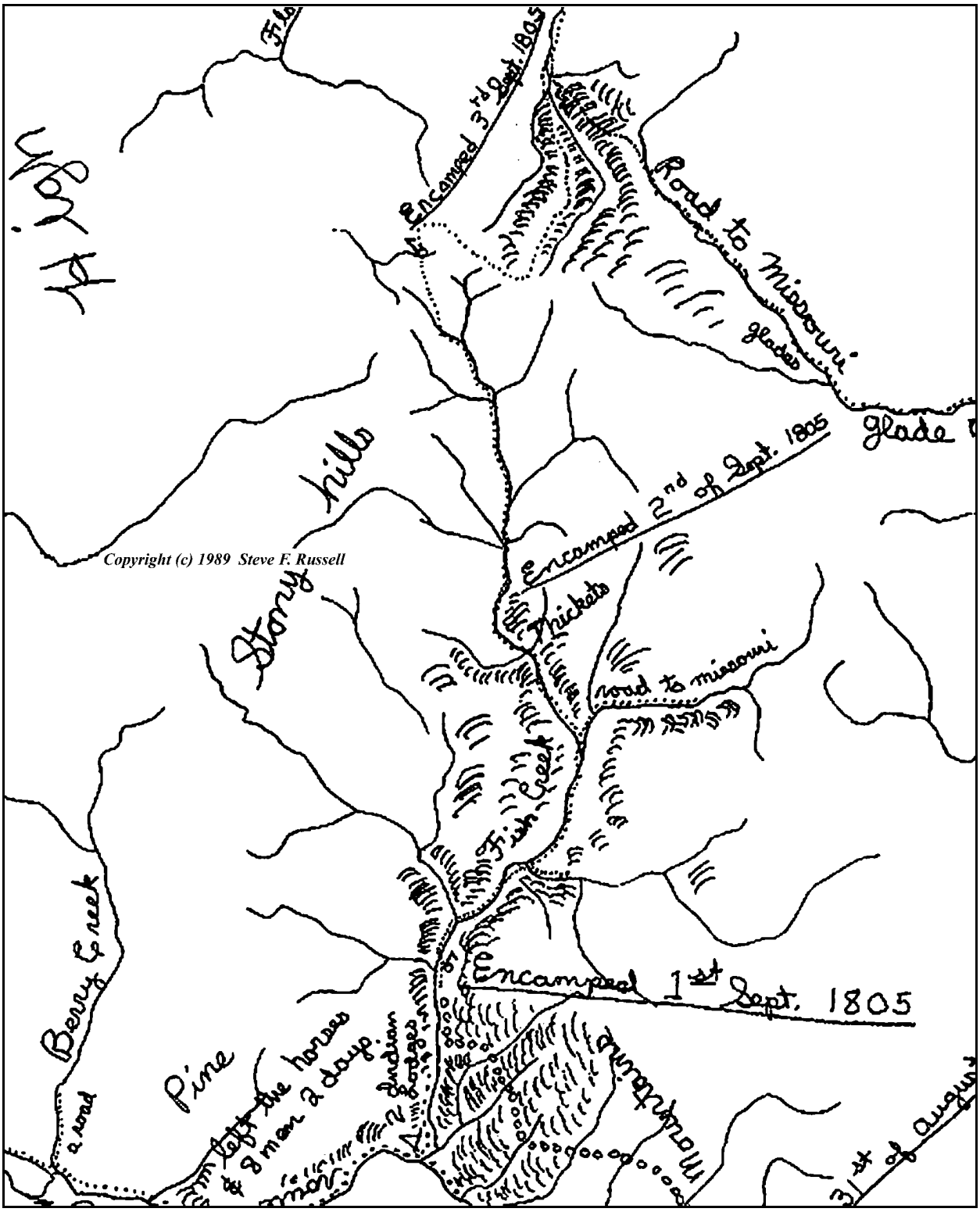


Figure 2. Topographically corrected scrivener copy of the Clark map showing the same general area as that of Fig. 1 (1989).

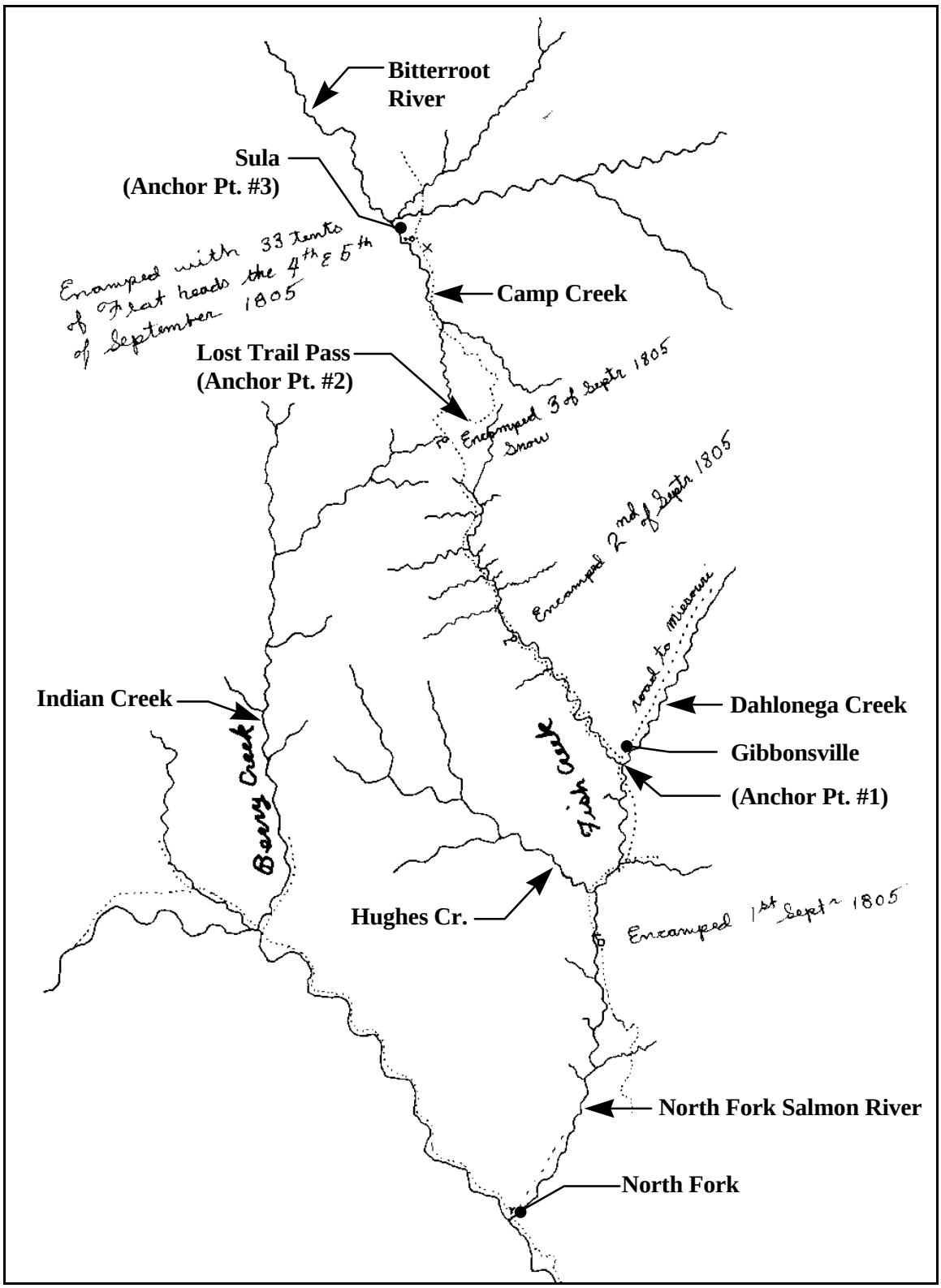


Figure 3. Anchor points and modern topographic references that are easily identified on Clark's map.

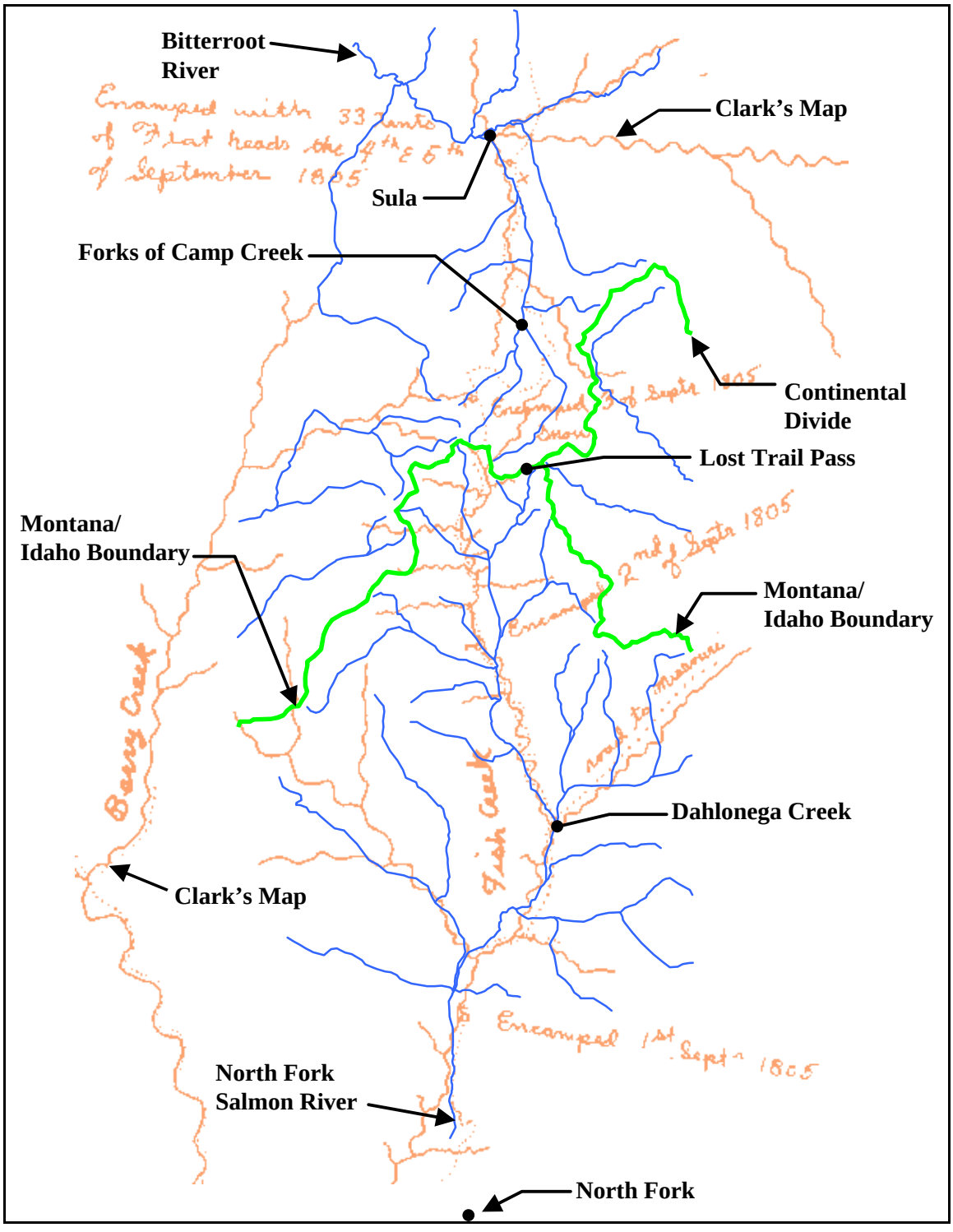


Figure 4. Reference Frame #1 alignment of Clark's Map with modern topography using Sula and the mouth of Dahlonega Creek (near Gibbonsville) as anchor points.

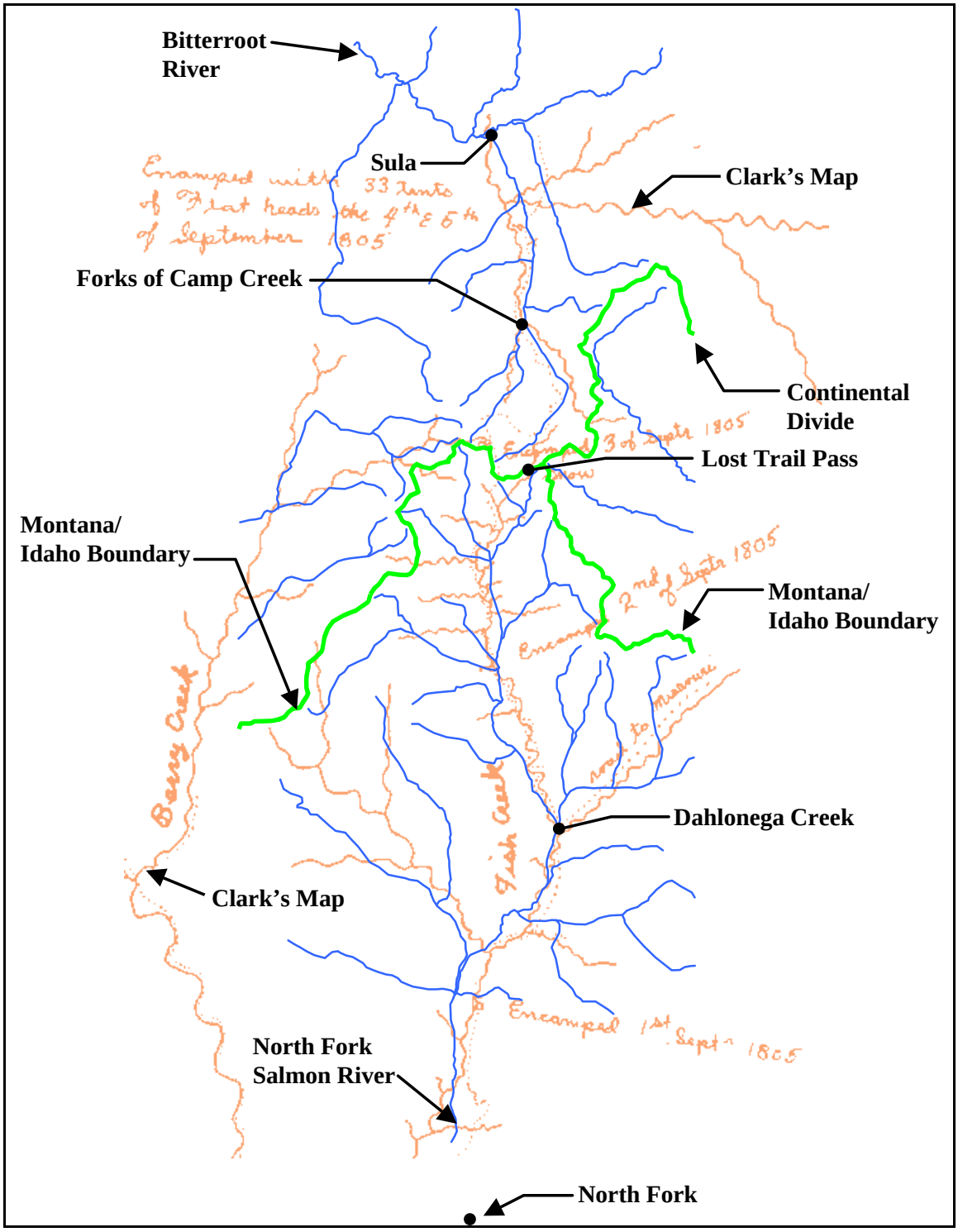


Figure 5. Reference Frame #2 alignment of Clark's map with modern topography where Dahlonega Creek is closely aligned to the correct position, the forks of Camp Creek are closely aligned, and the Lost Trail Pass area is as closely aligned as possible.

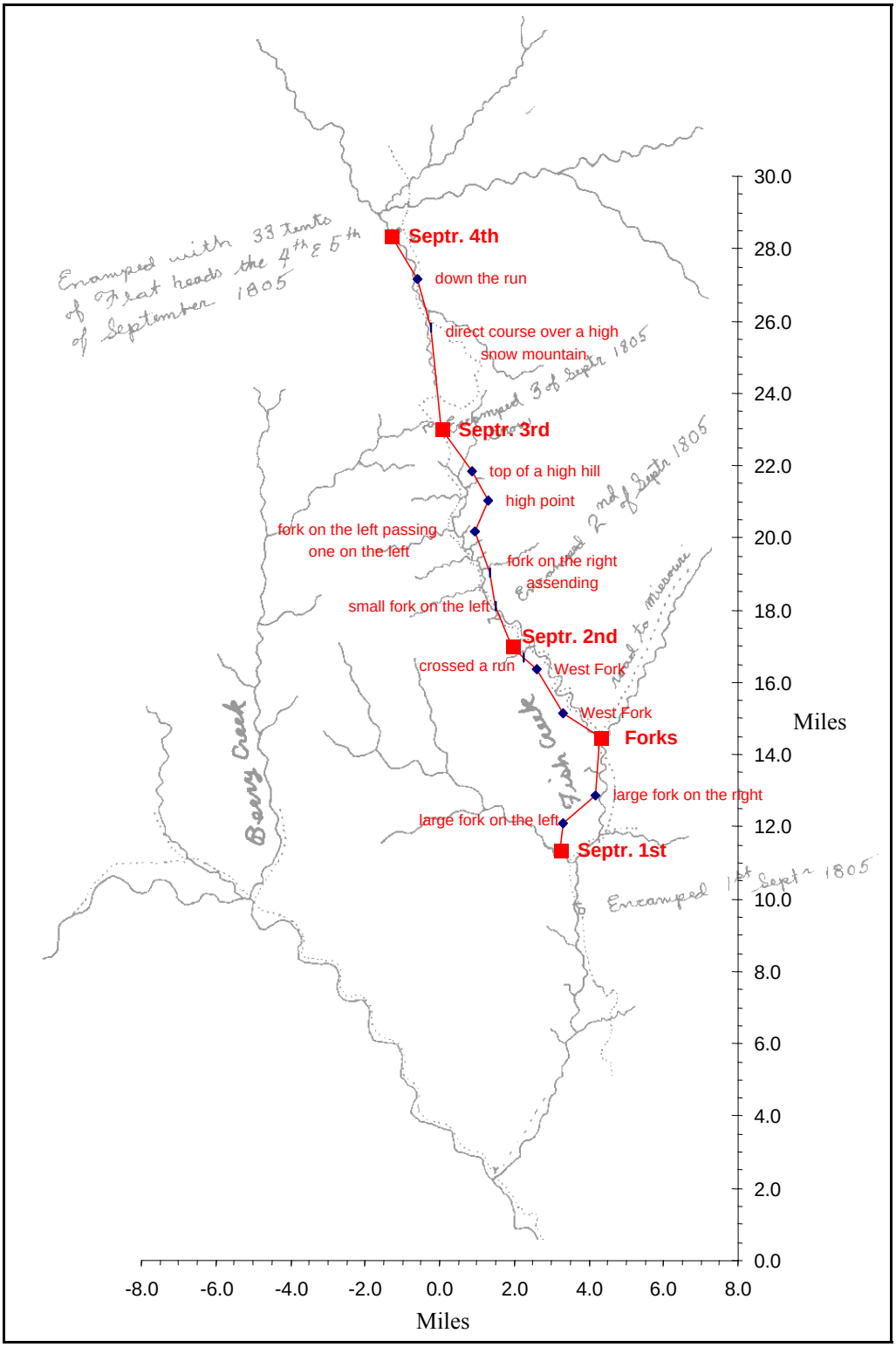


Figure 6. Courses and distances from Clark's table superimposed on Clark's modified map.

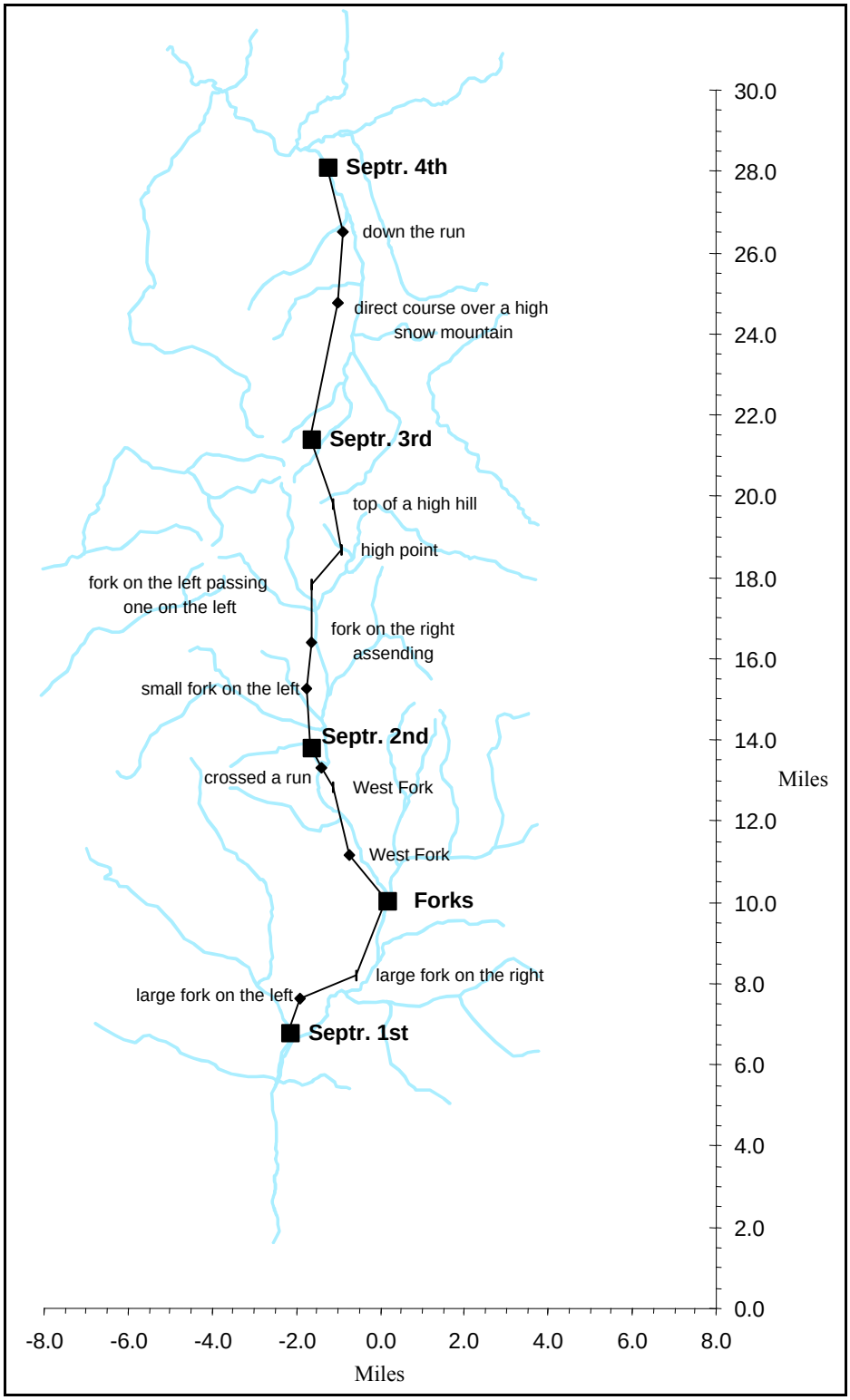


Figure 7. Ground-track data from Clark's table plotted on a modern topographic map using Reference Frame #1.

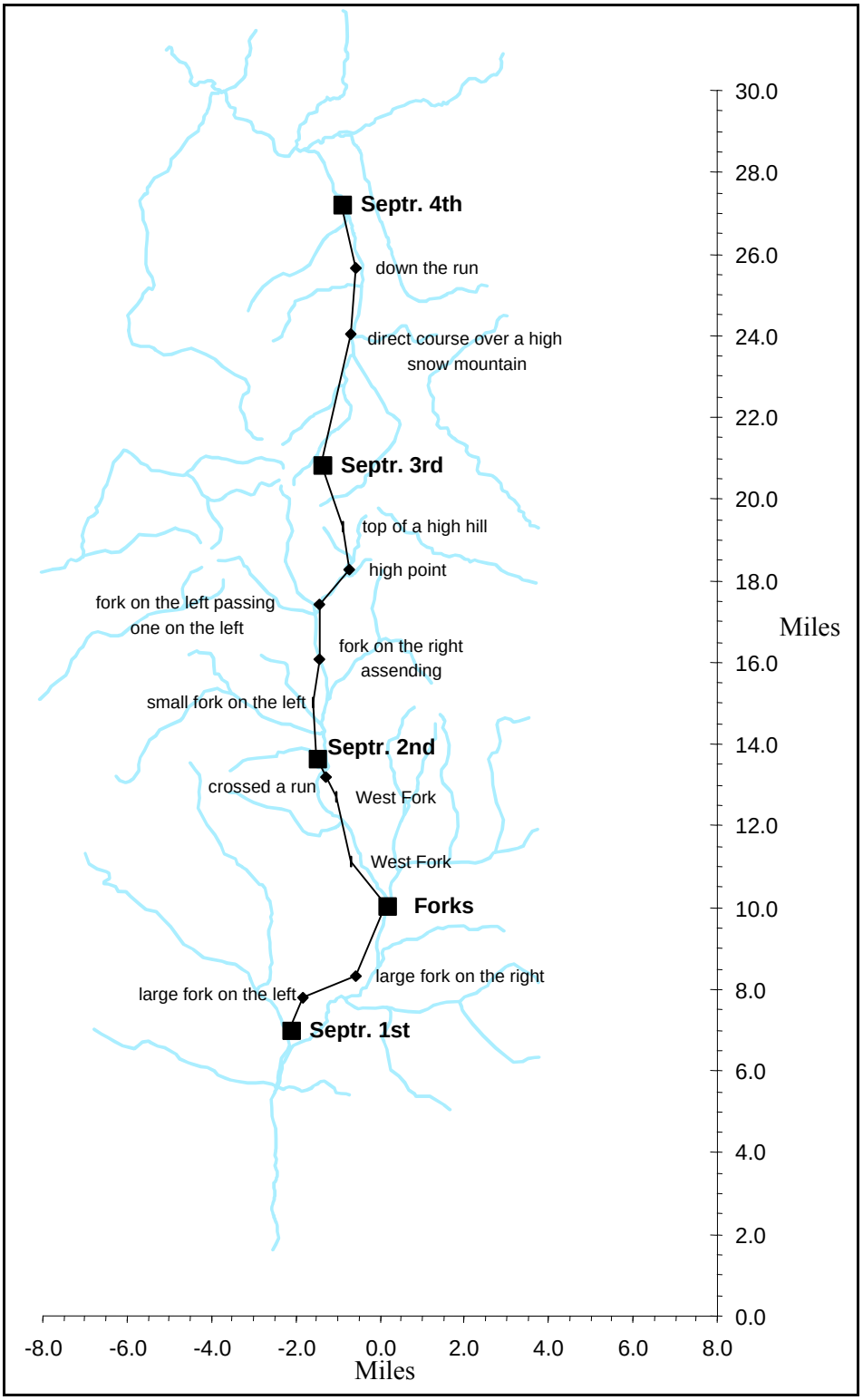


Figure 8. Ground-track data from Clark's table plotted on a modern topographic map using Reference Frame #2.

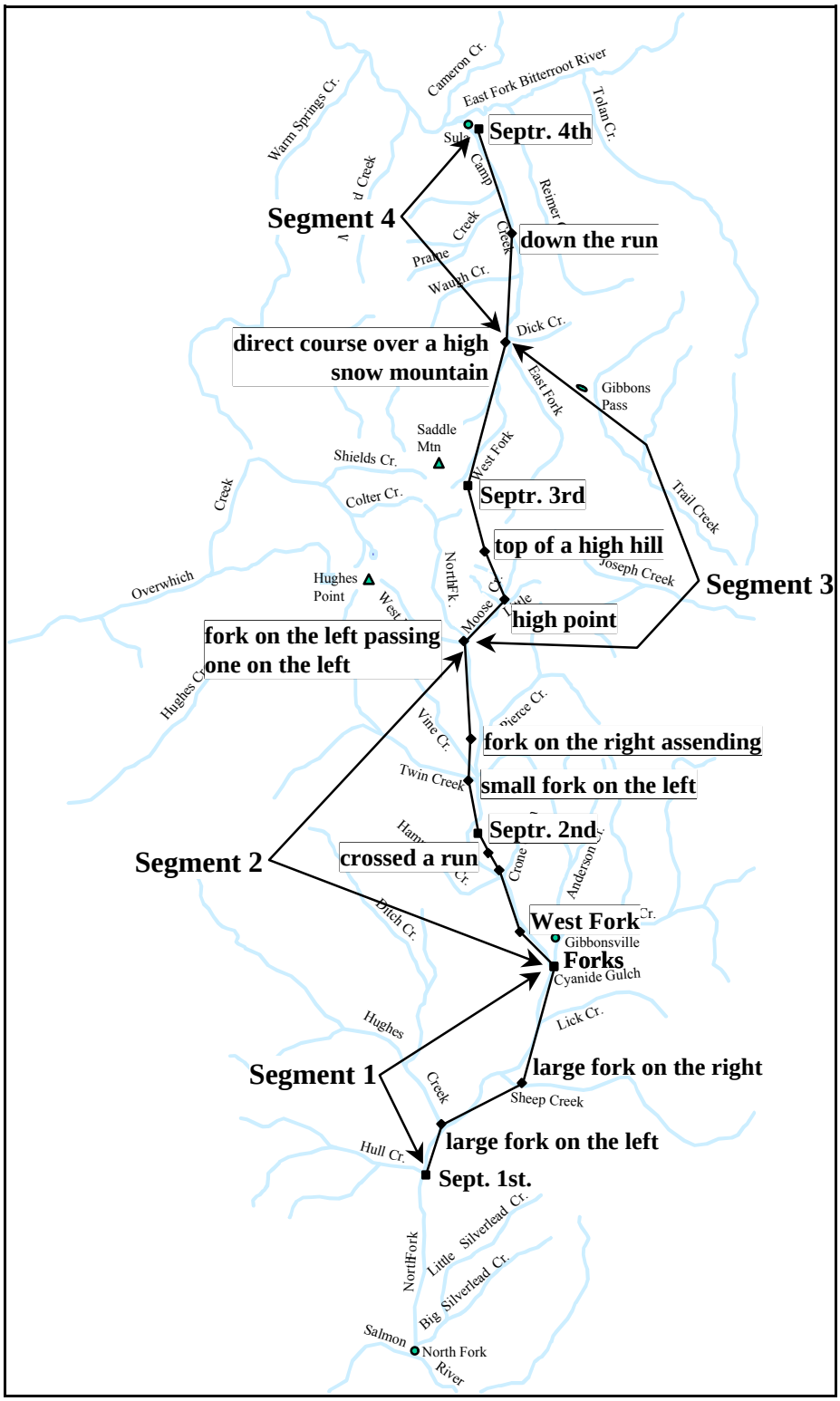


Figure 9. The ground track overlay for Segment-1 (Bill's Canyon to Dahlonega Cr.), Segment-2 (Dahlonega Cr. to Moose Cr.), Segment-3 over Lost Trail Pass (Moose Cr. to Camp Cr.), and Segment-4 from the forks of Camp Creek to Sula.

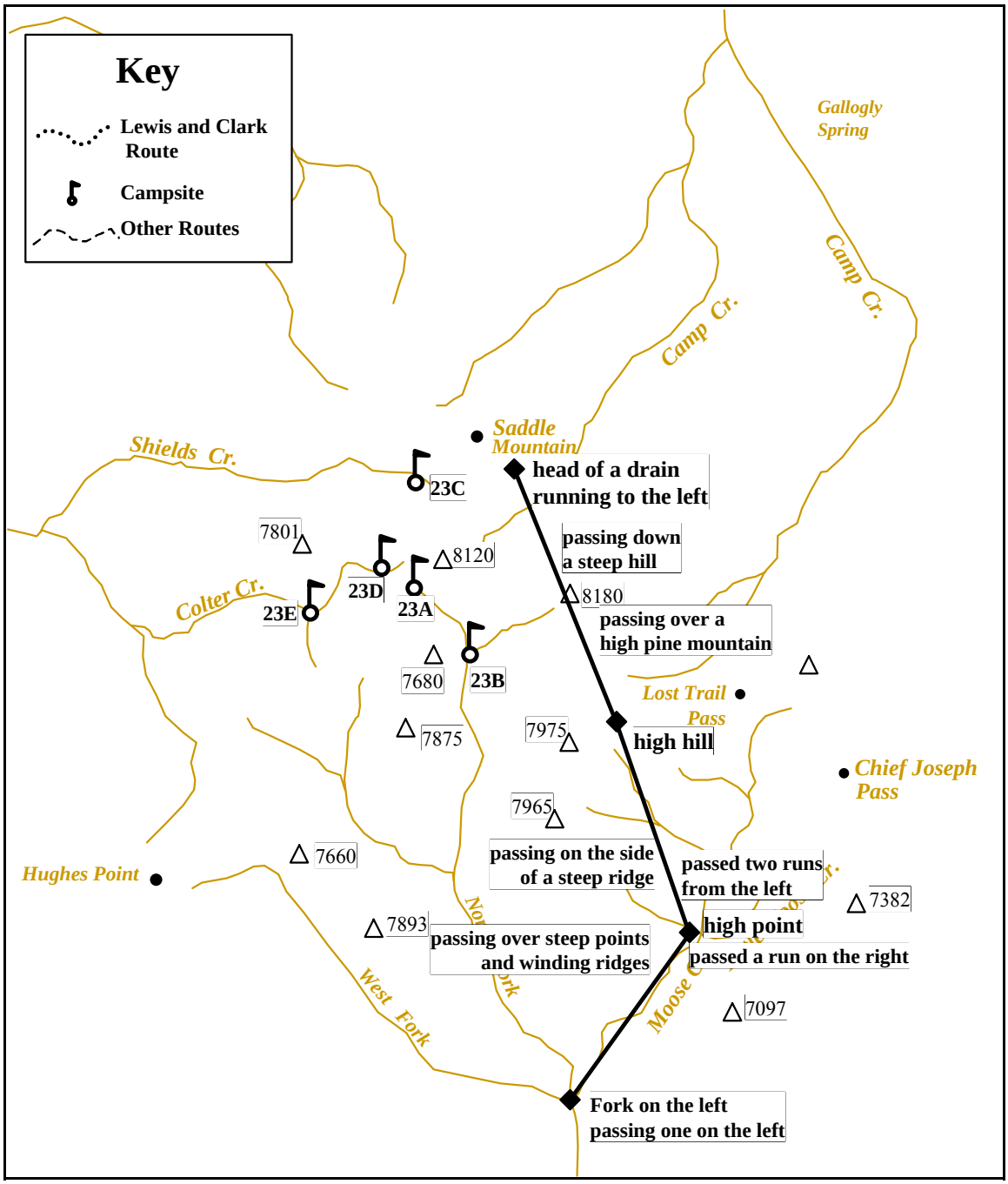


Figure 10. Candidate campsites for September 3, 1805.

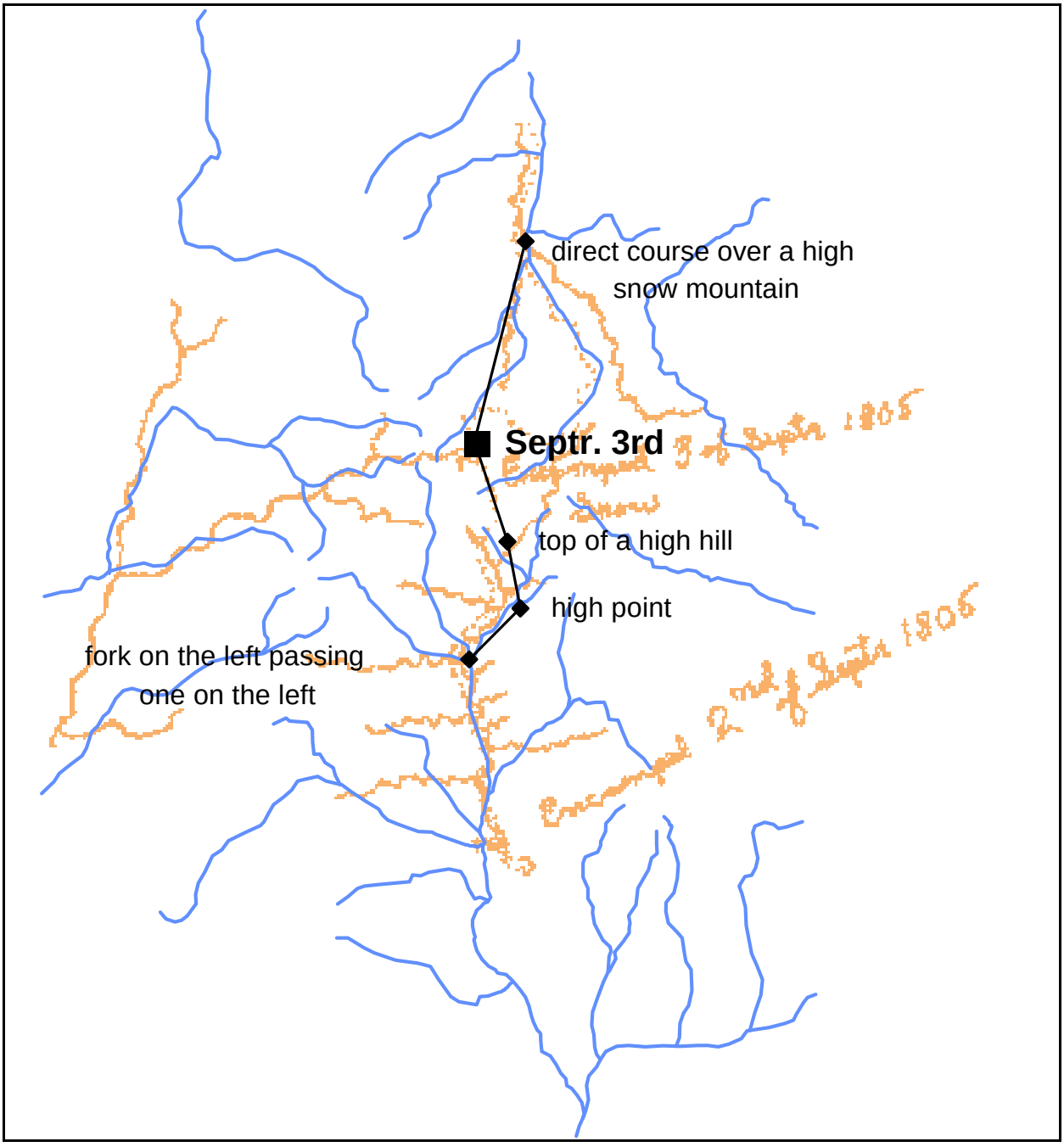


Figure 11. Lost Trail pass area where the modified Clark map is overlayed by the modern water courses which are, in turn, overlayed by the ground track of the courses and distances.

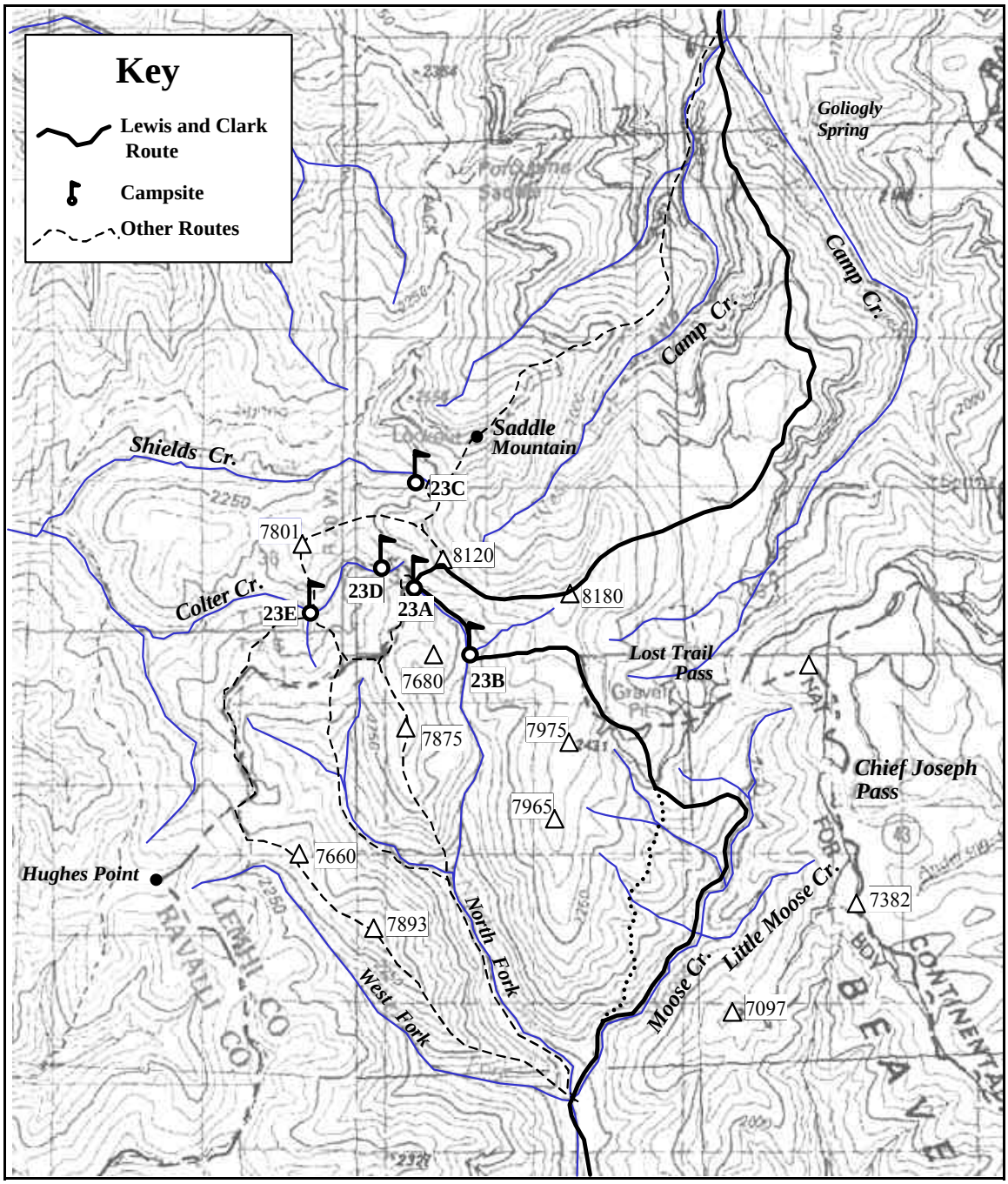


Figure 12. Final topographic map of the controversial route over Lost Trail Pass.

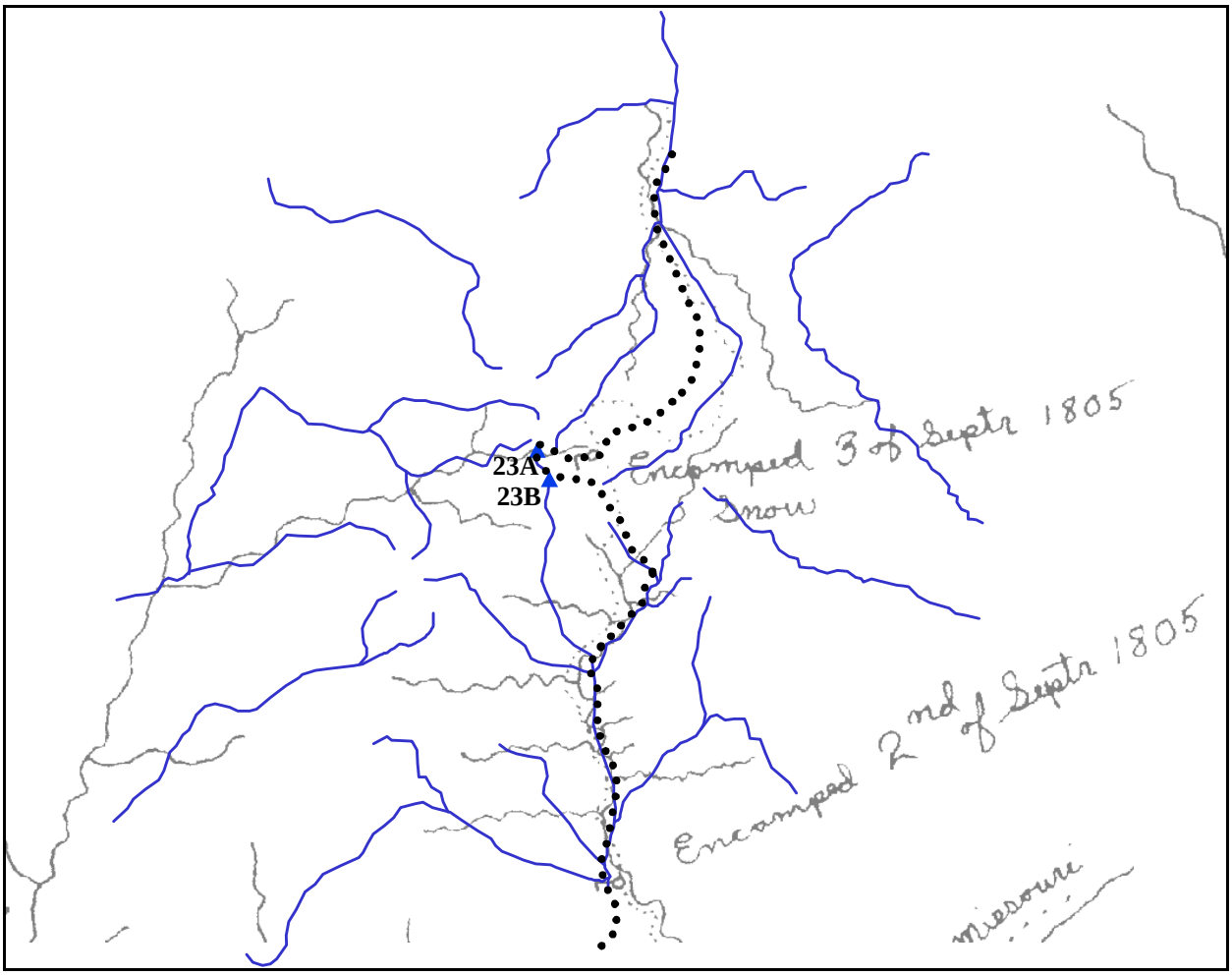


Figure 13. Map using the overlays of the water courses, the Clark map, and the selected route.

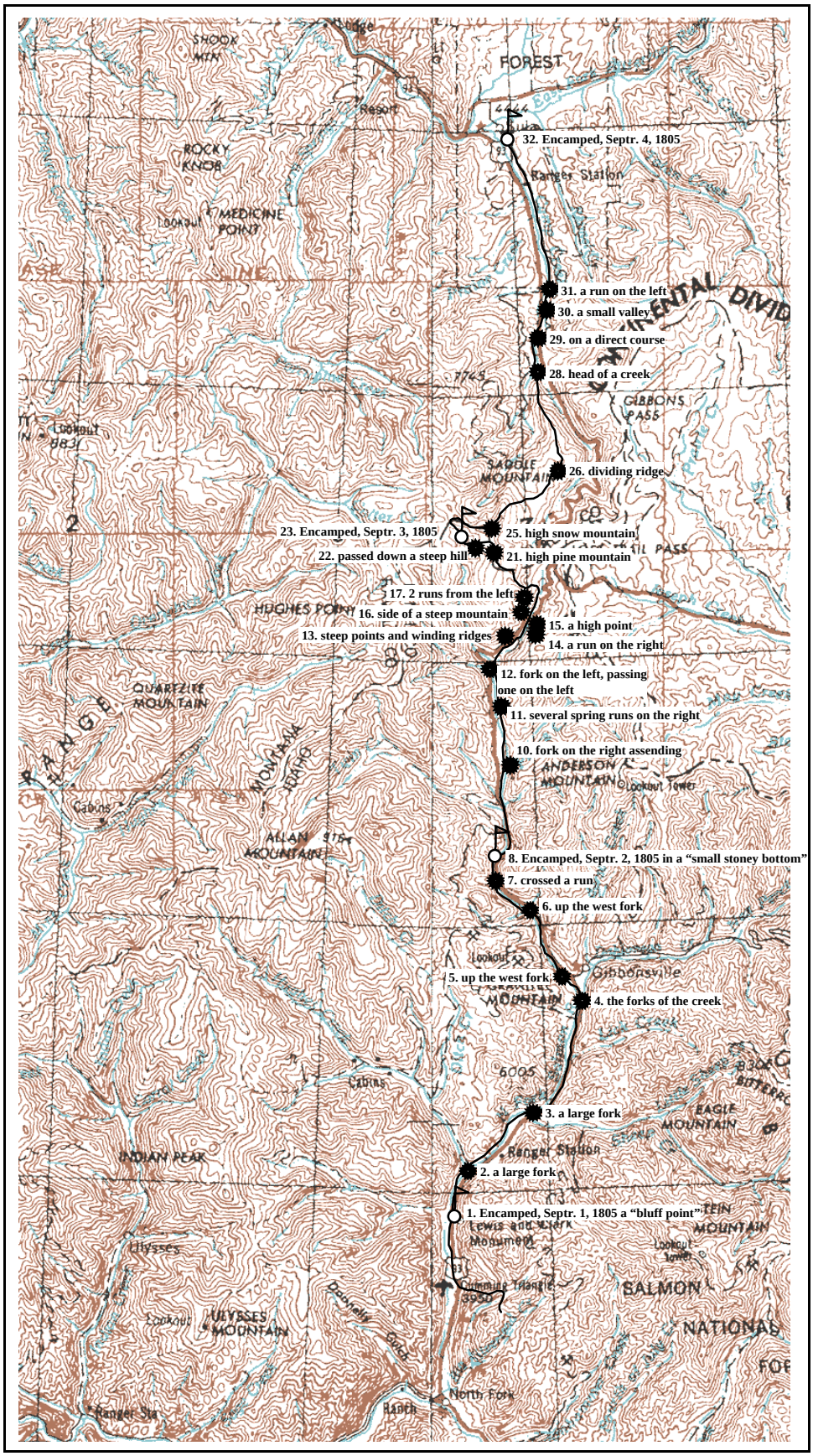

32. Encamped, Septr. 4, 1805
31. a run on the left
30. a small valley
29. on a direct course
28. head of a creek
26. dividing ridge
25. high snow mountain
21. high pine mountain
23. Encamped, Septr. 3, 1805
22. passed down a steep hill
17. 2 runs from the left
16. side of a steep mountain
15. a high point
13. steep points and winding ridges
14. a run on the right
12. fork on the left, passing one on the left
11. several spring runs on the right
10. fork on the right assending
8. Encamped, Septr. 2, 1805 in a "small stoney bottom"
7. crossed a run
6. up the west fork
5. up the west fork
4. the forks of the creek
3. a large fork
2. a large fork
1. Encamped, Septr. 1, 1805 a "bluff point"
FOREST
Ranger Station
ROCKY KNOB
MEDICINE POINT
GIBBONS PASS
SADDLE MOUNTAIN
HUGHES POINT
QUARTZITE MOUNTAIN
ANDERSON MOUNTAIN
Lookout Tower
ALLAN MOUNTAIN
Gibbonsville
EAGLE MOUNTAIN
INDIAN PEAK
Lewis and Clark
ULYSSES MOUNTAIN
SALMON
NATIONAL
North Fork

Figure 14. Final results of the route from Bills Canyon in Idaho to Sula in Montana showing the campsites and the geographic references.

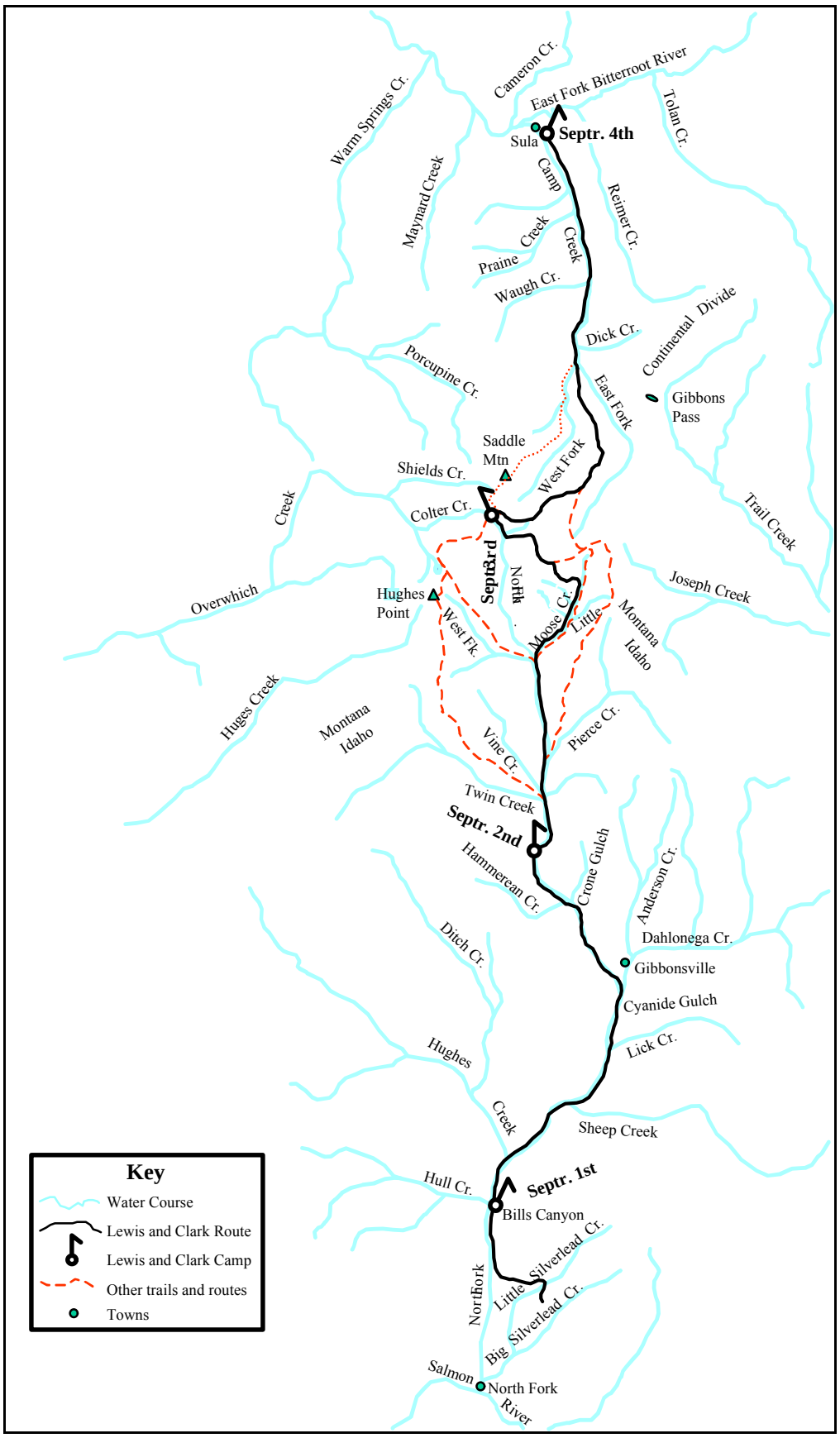
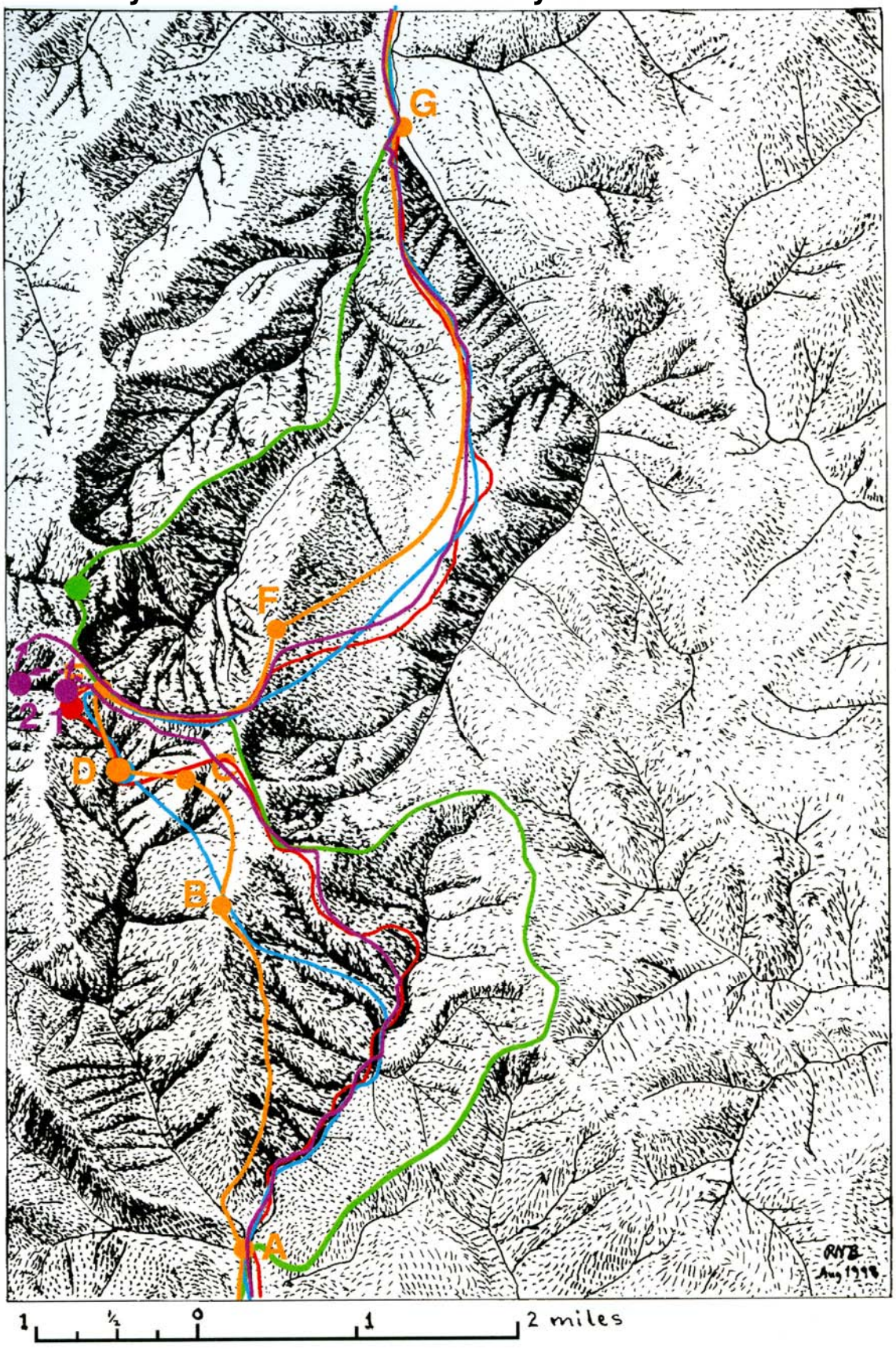


Figure 15. Summary map of the route and camping places.

Summary of the Routes Chosen by the Five Researchers



Robert N. Bergantino | Hadley B. Roberts | James R. Wolf | Steve F. Russell | J. Wilmer Rigby

Note: The Sept. 3 campsite identified on the routes of both Rigby and Roberts is identical.